

CLAIMS

1. (Original): An isolated nucleic acid molecule comprising nucleotides 658 to 2580 of SEQ ID NO:1, nucleotides 736 to 2580 of SEQ ID NO:1, nucleotides 163 to 2064 of SEQ ID NO:3, nucleotides 217 to 2064 of SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, or SEQ ID NO:9 or a nucleic acid molecule that hybridizes under stringent conditions to the complement of nucleotides 658 to 2580 of SEQ ID NO:1, nucleotides 163 to 2064 of SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, or SEQ ID NO:9 and which encodes a functional β -glucuronidase.

2. (Original): An isolated nucleic acid molecule that encodes one of the amino acid sequences of SEQ ID NO: 2, residues 27-641 or SEQ ID NO:2, 4, residues 19-634 of SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO: 8, or SEQ ID NO: 10, or a variant thereof wherein the variant has at least 90% amino acid identity to one of SEQ ID NO: 2, residues 27-641 or SEQ ID NO:2, 4, residues 19-634 of SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO: 8, or SEQ ID NO: 10 and which encodes a functional β -glucuronidase.

3. (Original): An isolated nucleic acid molecule encoding a fungal β -glucuronidase, wherein the fungus is a member of the Eurotiomycetes or Sordariomycetes class.

4. (Original): The nucleic acid molecule of claim 3, wherein the fungus is a member of the *Penicillium*, *Eupenicillium*, *Scopulariopsis*, *Aspergillus*, or *Gibberella* (anamorph *Fusarium*) genera.

5. (Original): The nucleic acid molecule of claim 3, wherein the fungus is *Penicillium canescens*, *Aspergillus nidulans*, or *Gibberella zaea* (anamorph *Fusarium graminearum*).

6. (Original): The nucleic acid molecule of claim 3, wherein the fungus is a member of the genera that has at least 90% sequence identity to SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, or SEQ ID NO:31

7. (Original): An expression vector, comprising a nucleic acid sequence encoding a fungal β -glucuronidase in operative linkage with a heterologous promoter, wherein the fungus is a member of the *Penicillium*, *Eupenicillium*, *Scopulariopsis*, *Aspergillus*, or *Gibberella* (anamorph *Fusarium*) genera.

8. (Original): The expression vector of claim 7, wherein the fungal β -glucuronidase encodes SEQ ID NO: 2, residues 27-641 or SEQ ID NO:2, 4, residues 19-634 of SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO: 8, or SEQ ID NO: 10, or variant thereof, wherein the variant has at least 90% amino acid identity to one of SEQ ID NO: 2, residues 27-641 or SEQ ID NO:2, 4, residues 19-634 of SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO: 8, or SEQ ID NO: 10, and which encodes a functional β -glucuronidase.

9. (Original): The expression vector of claim 7, wherein the fungal β -glucuronidase is encoded by nucleotides 658 to 2580 of SEQ ID NO:1, nucleotides 736 to 2580 of SEQ ID NO:1, nucleotides 163 to 2064 of SEQ ID NO:3, nucleotides 217 to 2064 of SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, or SEQ ID NO:9, or by a nucleic acid molecule that hybridizes under stringent conditions to the complement of nucleotides 658 to 2580 of SEQ ID NO:1, nucleotides 736 to 2580 of SEQ ID NO:1, nucleotides 163 to 2064 of SEQ ID NO:3, nucleotides 217 to 2064 of SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, or SEQ ID NO:9, and which encodes a functional β -glucuronidase.

10. (Original): The expression vector of claim 7, wherein the promoter is functional in a cell selected from the group consisting of a plant cell, a bacterial cell, an animal cell and a fungal cell.

11. (Original): The expression vector of claim 7, wherein the vector is a binary *Agrobacterium tumefaciens* plasmid vector.

12. (Original): The expression vector of claim 7, further comprising a nucleic acid sequence encoding a product of a gene of interest.

13. (Original): The expression vector of claim 12, wherein the product is a protein.

14. (Original): The expression vector of claim 7, wherein the fungal β -glucuronidase is an enzymatically active portion thereof.

15. (Original): A host cell containing the vector according to claim 7.

16. (Original): The host cell of claim 15, wherein the host cell is selected from the group consisting of a plant cell, an insect cell, a fungal cell, an animal cell and a bacterial cell.

17. (Original): A transgenic plant cell comprising the vector according to claim 7.

18. (Original): A transgenic plant comprising the plant cell of claim 17.

19. (Original): A method for monitoring expression of a gene of interest or a portion thereof in a host cell, comprising:

(a) introducing into the host cell a vector construct, the vector construct comprising a nucleic acid molecule according to claim 1, and which encodes a functional β -glucuronidase and a nucleic acid molecule encoding a product of the gene of interest; wherein the β -glucuronidase and the gene of interest are co-expressed;

(b) detecting the presence of the β -glucuronidase, thereby monitoring

expression of the gene of interest.

20. (Original): A method for transforming a host cell with a gene of interest or portion thereof, comprising:

(a) introducing into the host cell a vector construct, the vector construct comprising a nucleic acid molecule according to claim 1, and which encodes a functional β -glucuronidase, such that the vector construct integrates into the genome of the host cell; wherein the β -glucuronidase and the gene of interest are co-expressed;

(b) detecting the presence of the β -glucuronidase, thereby establishing that the host cell is transformed.

21 (Original): A method for positive selection for a transformed cell, comprising:

(a) introducing into a host cell a vector construct, the vector construct comprising a nucleic acid molecule according to claim 1, and which encodes a functional β -glucuronidase;

(b) exposing the host cell to a sample comprising a glucuronide, wherein the glucuronide is cleaved by the β -glucuronidase, such that an aglycone is released, wherein the aglycone is advantageous for growth of the host cell; wherein a host cell that expresses the β -glucuronidase grows, thereby positively selecting a transformed cell.

22. (Original): The method of claim 21, further comprising introducing into the host cell a vector construct comprising a nucleic acid sequence encoding a fungal glucuronide transporter.

23. (Original): The method of claim 21, wherein the β -glucuronidase is fused to a nucleic acid molecule encoding a signal peptide.

24. (Original): The method of either of claims 21 or 23, wherein the host cell is selected from the group consisting of a plant cell, an animal cell, an insect cell, a fungal cell and a bacterial cell.

25. (Original): The method according to claim 21, wherein the compound is an auxin or a hormone.

26. (Original): The method according to claim 25, wherein the auxin is indole-3-ethanol.

27. (Original): The method according to claim 21, wherein the glucuronide is cellobiuronic acid.

28. (Original): A method of releasing a compound from a glucuronide exposed to a host cell, comprising:

(a) introducing into the host cell a vector construct, the vector construct comprising a nucleic acid molecule encoding a β -glucuronidase; and

(b) exposing the host cell to the glucuronide, wherein the glucuronide is cleaved by the β -glucuronidase, such that the compound is released.

29. (Original): A method of monitoring activity of a controller element in a host cell comprising

(a) introducing into the host cell a vector construct, the vector construct comprising nucleic acid sequence encoding a β -glucuronidase and a nucleic acid sequence of the controller element, wherein the nucleic acid sequence encoding the β -glucuronidase (a) encodes a protein comprising the amino sequence of SEQ ID NO: 2, residues 27-641 or SEQ ID NO:2, 4, residues 19-634 of SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO: 8, or SEQ ID NO: 10 or (b) hybridizes under stringent conditions to the complement of nucleotides 658 to 2580 of SEQ ID NO:1, nucleotides 736 to 2580 of SEQ ID NO:1, nucleotides 163 to 2064 of SEQ ID NO:3, nucleotides 217 to 2064 of SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, or SEQ ID

NO:9, and which encodes a functional β -glucuronidase, and wherein the nucleic acid sequence encoding the β -glucuronidase is in operative linkage with the controller element and

(b) detecting the presence of the β -glucuronidase, thereby monitoring activity of the controller element.

30. (Original): The method according to claim 29, wherein the controller element is a promoter or an enhancer.

31. (Original): An isolated form of fungal β -glucuronidase protein, wherein the fungus is a member of the Eurotiomycetes or Sordariomycetes class.

32. (Original): The protein according to claim 31, wherein the fungus is a member of the *Penicillium*, *Eupenicillium*, *Scopulariopsis*, *Aspergillus*, or *Gibberella* (anamorph *Fusarium*) genera.

33. (Original): The protein according to claim 32, wherein the fungus is *Penicillium canescens*, *Aspergillus nidulans*, or *Gibberella zaea* (anamorph *Fusarium graminearum*).

34. (Original): The protein according to claim 31, wherein the β -glucuronidase has SEQ ID NO: 2, residues 27-641 or SEQ ID NO:2, 4, residues 19-634 of SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO: 8, or SEQ ID NO: 10, or variant thereof, wherein the variant has at least 90% amino acid identity to one of SEQ ID NO: 2, residues 27-641 or SEQ ID NO:2, 4, residues 19-634 of SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO: 8, or SEQ ID NO: 10, and which has β -glucuronidase activity.

35. (Original): The protein according to claim 31, wherein the β -glucuronidase is encoded by nucleotides 658 to 2580 of SEQ ID NO:1, nucleotides 736 to 2580 of SEQ ID NO:1, nucleotides 163 to 2064 of SEQ ID NO:3, nucleotides 217 to 2064 of SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, or SEQ ID NO:9, or by a nucleic acid molecule

that hybridizes under stringent conditions to the complement of nucleotides 658 to 2580 of SEQ ID NO:1, nucleotides 736 to 2580 of SEQ ID NO:1, nucleotides 163 to 2064 of SEQ ID NO:3, nucleotides 217 to 2064 of SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, or SEQ ID NO:9, and which encodes a functional β -glucuronidase.